Abstract for AGU Fall Meeting (Dec 1999)

Title: Vertical Profiles of Sulfuric Acid Aerosols in the Stratosphere
and Upper Troposphere from the High Resolution ATMOS FTIR Measurements

Suggested Session: Modeling and Measurement of Global Aerosol Climatologies
Conveners: Robert Curran (NASA HQ) and Joyce Penner (U Mich)
Alternate Sessions: Anthropogenic Aerosol Forcing, Climate, and Global Change
Effects Over the Tropical Indian Ocean
Wherever they want to put it

Preferred Medium: Poster

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Abstract:

Sulfuric acid aerosols in
the stratosphere provide sites for heterogeneous chemistry that can alter
the gas phase composition of the stratosphere, particularly following
strong volcanic eruptions such as Mt. Pinatubo in 1991, and aerosols
are also important for understanding the radiative balance in the
terrestrial atmosphere. A new method of characterizing these aerosols
has been developed based on the high spectral resolution (0.01 cm^{-1}
at 625 - 4500 cm^{-1}, 2.2 - 16 μm) solar occultation measurements
obtained by the Atmospheric Trace Molecule Spectrometer (ATMOS) in 1992,
1993, and 1994. The new technique first determines the extinction due to
gases within 2 cm^{-1} intervals then fits the remaining ``continuum''
extinction using calculated aerosol models at 2 cm^{-1} resolution over a
400 cm^{-1} interval. The technique has been used to derive vertical
profiles for sulfuric acid aerosols even during the heavy sulfate
loading present in early 1992, and zonally averaged vertical profiles will
be presented for the three measurement periods. The results are sensitive
to the composition of the sulfate aerosols, so refractive index data
from multiple laboratory measurements have been compared with the
measured atmospheric aerosol extinction. The aerosol extinctions
determined from this analysis of the ATMOS measurements will also be
compared to those derived from other satellite measurements, such as ISAMS.
Measurements from ISAMS, CLAES, and SAGE have previously been used to
characterize the post Pinatubo aerosols, but these instruments have
relied on a limited number of well-separated spectral channels.